Designation: D5065 – 13

Standard Guide for Assessing the Condition of Aged Coatings on Steel Surfaces[1]

This standard is issued under the fixed designation D5065; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide describes general procedures for conducting a detailed assessment of the condition of aged coatings on steel structures and the extent of rust breakthrough of the coated surface. Additional assessment may be required to support coating failure analyses or other job specific needs.

1.2 This guide does not address the problem of determining the structural condition of a steel substrate. It provides procedures to determine the percent of the surface rusted, but not the severity, condition, or cause of such rusting.

NOTE 1—A more comprehensive condition assessment procedure, Practice F1130, has been developed for determining the condition of coatings on a ship.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D610 Practice for Evaluating Degree of Rusting on Painted Steel Surfaces

D660 Test Method for Evaluating Degree of Checking of Exterior Paints

D714 Test Method for Evaluating Degree of Blistering of Paints

D3359 Test Methods for Measuring Adhesion by Tape Test

D4214 Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

D4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

D5702 Practice for Field Sampling of Coating Films for Analysis for Heavy Metals

D6206 Practice for Sampling of Coating Films

D6677 Test Method for Evaluating Adhesion by Knife

D7091 Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

F1130 Practice for Inspecting the Coating System of a Ship

2.2 *Steel Structures Painting Council Standard:*[3]

SSPC-PA-2 Procedure for Determining Conformance to Dry Coating Thickness Requirements

3. Summary of Practice

3.1 This practice for assessing the condition of coatings consists of identifying general types of components of a structure and assessing each separately for commonly occurring modes of coating deterioration and rust breakthrough of the coating using visual standards and simple evaluation tools. A form for recording the results of the assessment procedure (Fig. 1) is provided.

4. Significance and Use

4.1 Assessment of the condition of aged coated surfaces strengthens decisions on when coating maintenance is required, aids in the selection of effective coating maintenance procedures, and provides a means to characterize performance of coating systems.

5. Procedure

5.1 Survey the structure to (*1*) determine the general types of unique components (for example, for fuel tanks the components may be shell, roof, ladders, and piping) and the service exposure environment for each, (*2*) visually identify areas having a typical level of coating deterioration and rust breakthrough for each component and (*3*) identify areas having a much greater visual level of deterioration than typical and unique environmental conditions that may correspond to these

[1] This guide is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.46 on Industrial Protective Coatings.

Current edition approved June 1, 2013. Published June 2013. Originally approved in 1990. Last previous edition approved in 2007 as D5065 – 07. DOI: 10.1520/D5065-13.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, http://www.sspc.org.

Condition Assessment											
Structure		Date		Inspector				Overall Environment			
Original Coating System				1st Maintenance Coating System				2nd Maintenance Coating System			
Surface Preparation				Surface Preparation				Surface Preparation			
Year Applied				Year Applied				Year Applied			
Primer				Primer				Primer			
Midcoat				Midcoat				Midcoat			
Midcoat				Midcoat				Midcoat			
Topcoat				Topcoat				Topcoat			
Structure	Description	Ratings						Measurements			
Component	Local Environment	Rust[A]	Under film Condition[A]	Peeling	Blistering	Cracking	Chalking	Thickness	Adhesion	Remarks	

[A]Rusting corresponds to Test Methods D610, that is, that observed upon visual inspection of the coated surface while underfilm condition corresponds to substrate condition under an intact coating as described in Section 4.

FIG. 1 Example 1 Report Form

areas (for example, bridge expansion joints). Record a description of the components and their general environment on an inspection form and describe areas having greater deterioration, as well as any unique associated environments in the remarks column. A suggested general format for data collection is shown in Fig. 1. Modification of the form (for example, adding or deleting specific items) will be required for each specific application.

5.2 Based upon the knowledge of what constitutes typical deterioration for each component as determined in the initial survey, examine the condition of the coating on a representative sample of each component. Rate the condition of the coatings using the appropriate ASTM visual standard for rust breakthrough (Test Method D610), blistering (Test Method D714), peeling (use Test Methods D610 to report amount), chalking (Test Methods D4214), and cracking/checking (Test Method D660) of the coating film or other appropriate procedures as agreed upon between interested parties. Record the rating in the appropriate column of the report form for each component. Determine and record the type of peeling, for example, intercoat delamination. Rate the condition in enough areas to ensure that for each component the coating evaluation is representative of the condition over the entire structure. If additional areas of greater deterioration are detected during this assessment, make note of them in the remarks column.

NOTE 2—For the purpose of an initial general assessment, cracking and checking can be assessed as one type of failure, using the pictorial standards in Test Method D660 to define type and extent.

5.3 When rusting beneath an intact coating film is suspected, remove the coating and examine the condition of the underlying substrate. Remove apparently intact coatings using chemical strippers or closely spaced parallel knife cuts. For structural steel, determine the type of previous surface preparation from the presence of millscale or profile. Identify evidence of corrosion from the presence of pits, black anodic spots or corrosion scale. Record the results of the examination on the report form.

5.4 Using one of the procedures described in Practice D7091, determine the coating thickness in enough areas of each component (refer to SSPC-PA-2 for guidance) to ensure a representative measure. Record the measured thicknesses.

5.5 If a measure of coating adhesion is desired, use one of the procedures described in Test Methods D3359, D4541, or D6677. Determine coating adhesion in enough areas of each component to ensure a representative measure. Record the adhesion reading and the type of procedure and equipment used.

NOTE 3—The number of areas in which coating thickness and adhesion is measured will depend upon the desired precision of the measurement. More measurements would be made on structures in which precise knowledge of the thickness and adhesion of the coating is required. SSPC-PA-2 states the required number of thickness measurements as a function of coating area for conformance of thickness to a specification.

5.6 If required for a maintenance decision, identify the generic type(s) of the existing coating film component from records or by analyzing a sample of paint in the laboratory. Collect the paint sample in accordance with Practice D6206. To the extent possible, each layer of the film should be characterized.

5.7 If required for a maintenance decision, determine the concentration of heavy metals in the coating from a field sample. Collect the paint samples in accordance with the requirements of Practice D5702.

6. Report

6.1 Prepare an inspection report. Fig. 1 provides an example of the types of information to be included.

7. Keywords

7.1 assessment; coatings; condition; field; paint; weathered